Availability and Reliability of RF System FY06 Retreat

Topics

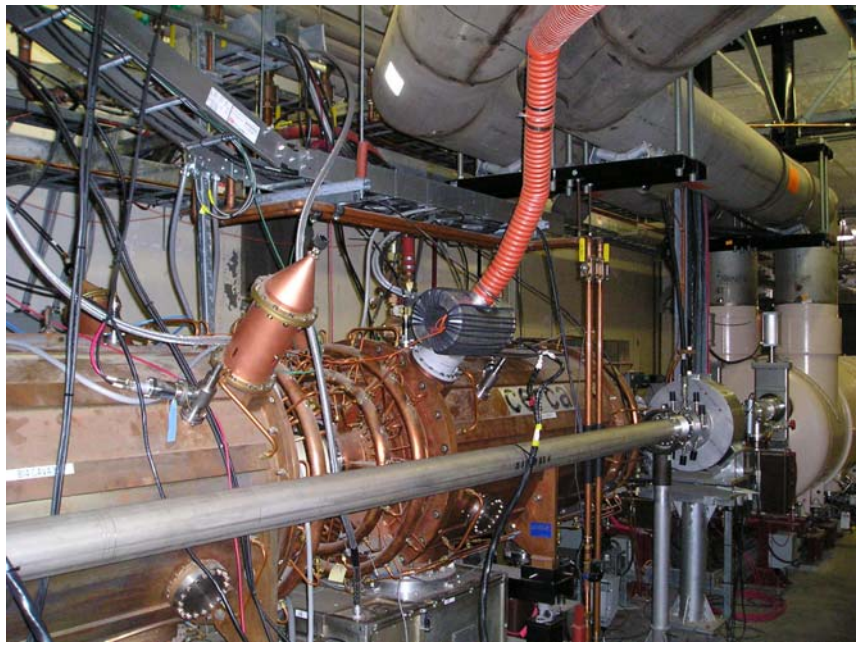
- Improvements
- Acceleration cavity tuners
- Storage cavity window R&D
- LLRF modifications and upgrade
- Maintenance

IMPROVEMENTS

- Window comparators to provide fast shutdown for storage systems
- Water cooling windows for storage systems
- 8 cavity set-up mode for AGS (new FG)
- Booster fast feedback to ease/eliminate retuning of cavities between NSRL and RHIC; better control of counter-phasing and cavity voltage

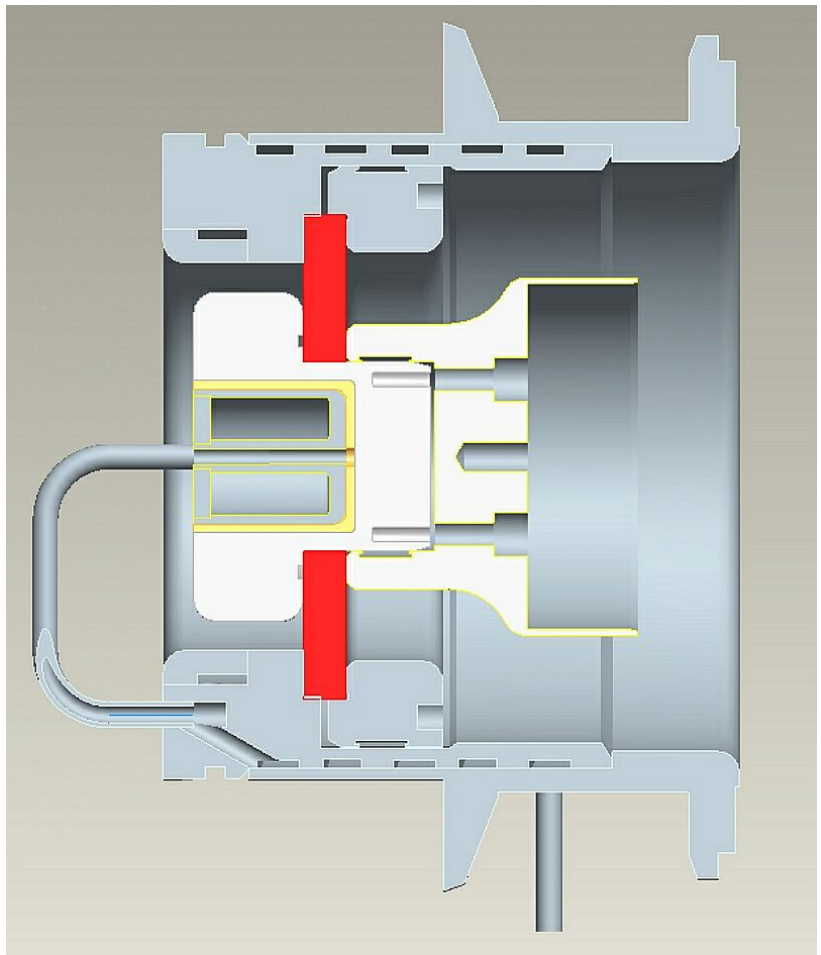
Mechanical Tuners on Acceleration Cavities

- The bearings were changed last summer
  - New design was implemented and commissioned during the last run
- In parallel, R&D proceeds on a ferrite tuner
  - A limited range vernier tuner will follow the thermal cycles and voltage steps
  - Prototype/first unit was successfully tested
  - Tuning range of +/- 1 kHz was easily achieved
  - Tested at voltage levels above 200 kV



Storage Cavity Window modifications and “improvements”

- DC bias
- Water cooling
- Titanium coating of the window
- Titanium coating of outer conductor
- Different geometry of inner conductor



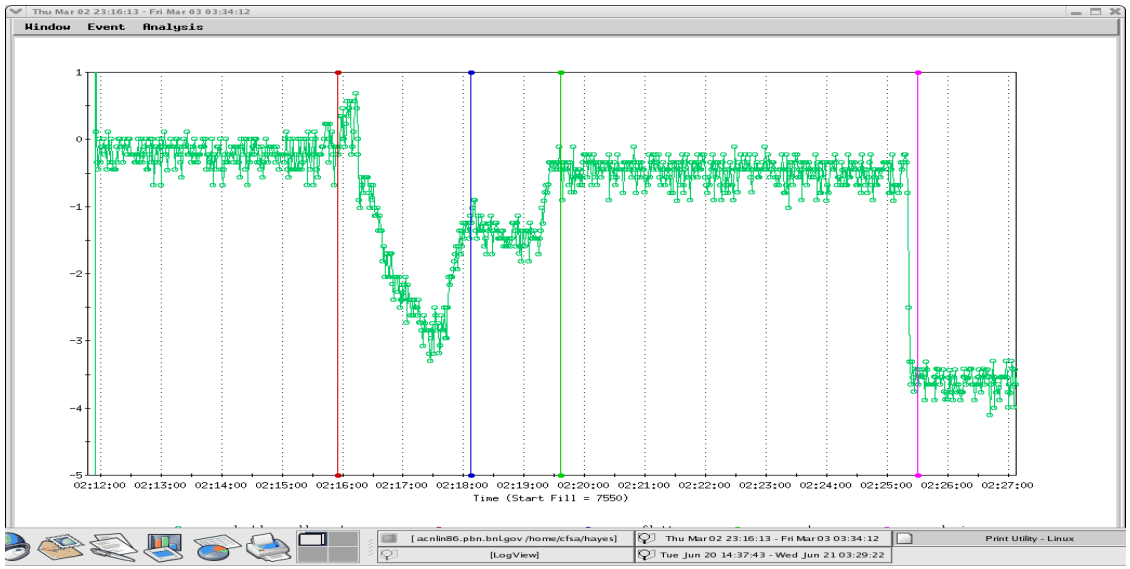
Low Level RF in Run 6

- AGS
  - New hardware to generate cavity drive
    - Remotely controlled
    - Archived settings
  - New revolution frequency markers
    - Independent phase settings for tune meter and polarimeter
  - Quad mode pumping at extraction

Low Level RF in Run 6

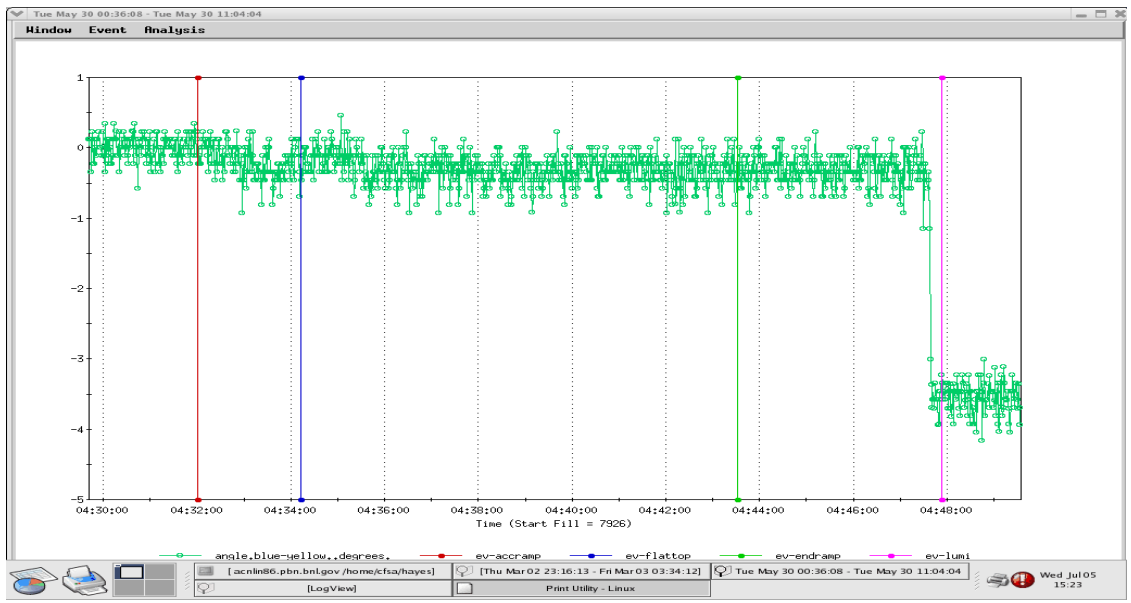
- RHIC
  - Blue Bucket Hopping
    - Intermittent problem
    - Failed hardware has been identified
    - Spare will be swapped in and original will be repaired
    - We will investigate methods to reposition beam sync clock ‘on the fly’
  - Ring to ring synchro improvements
    - Measure phase at h= 60 for greater resolution
    - Removed radial signal and increased synchro gain

Ring to Ring Synchro



Before

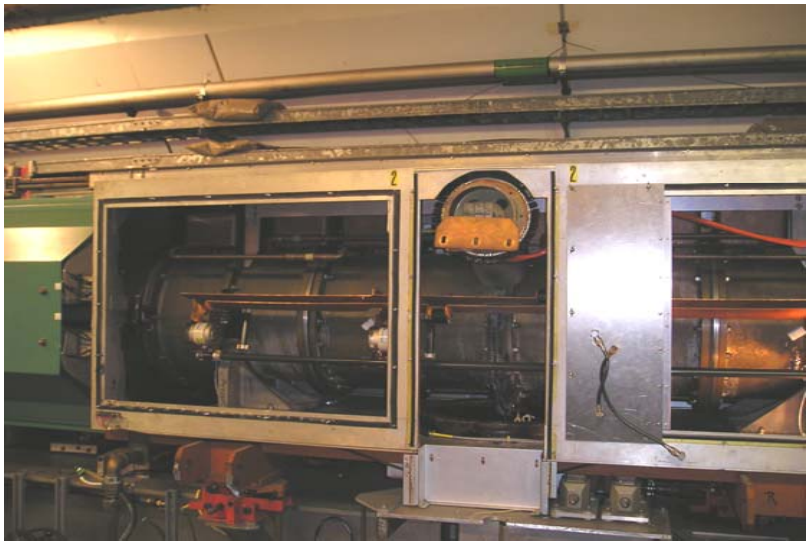
After

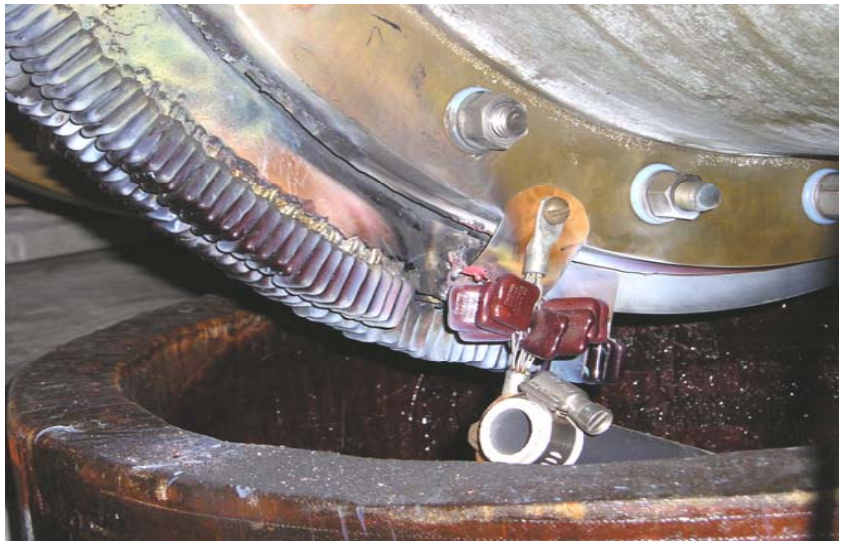


RHIC Low Level RF Upgrade

- Modular, High Speed Digital System
- Advantages
  - Common hardware across the entire complex
  - Replaces obsolete commercial DSP boards
  - Improved machine to machine synchronization

Maintenance!!!!!!!





- Booster
  - one ring access in ***FOUR*** month
  - could not change cooling fan in the anode PS from 3/3 till 4/18!
- AGS and RHIC
  - one eight hour period every two to three weeks! We don't count the time it takes to get into rings and time to lock them.
- What if we consider 4 hours/ring/week in the ring?